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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re:	Patent Application of Ulrich Reiners, *et al.*	:	Group Art Unit 1773
Conf. No.:	4175	:	
Appln. No.	09/851,460	:	Examiner: Kevin R. Kruer
Filed:	May 8, 2001	:	
For:	PAPER-LIKE AND THERMO-FORMABLE MULTILAYER BARRIER FILM	:	Attorney Docket No. **9784-3U2 (TH8002US/B)**

SECOND DECLARATION OF WALTER BERNIG UNDER 37 C.F.R. § 1.132

I, Walter Bernig, hereby declare as follows:

1. I am the same Walter Bernig who executed a prior Declaration Under 37 C.F.R. § 1.132, dated January 7, 2002 ("First Declaration"), which I understand was filed in the above application on January 14, 2002.

2. I am still employed by Convenience Food Systems, Kempten, Germany, an affiliated company of Convenience Food Systems B.V. and assignee of the above application.

3. The following additional tests were made under my supervision and control:

I. Layer composition

For each test below (both according to the invention of the above application and comparison tests) a multilayer film with three layers was produced according to the blown film coextrusion procedure. The sequence of the layers was: ABC, i.e., layer B was sandwiched between layers A and C. The layers had the following compositions:

Layer A (filled layer) consists of: 53 weight-% of a calcium carbonate with an average particle size of 4.5 µm and 47 weight-% of a polypropylene with a melt index of 2.1 g/10 min.

Layer B (barrier layer) consists of: 40 weight-% of an ethylene vinyl alcohol copolymer with an ethylene percentage of 38 mol-% and a melt index of 5.5 g/10min and 60 weight-% of the same polypropylene as layer A.

Layer C (sealing layer) consists of: 100 weight-% of an ethylene vinyl acetate copolymer with a melt index of 2 g /10 min.

II. Inventive Films according to US patent application 09/851,460

The following multilayer films (II a thru II e) were produced within the scope of the claims of the above application with filled layer A and unfilled layers B and C, as described above.

II a. Test

The thickness of each layers was:

Layer A	200 µm
Layer B	10 µm
Layer C	20 µm.

The total thickness of the multilayer film was 230 µm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:6.6

II b. Test

The thickness of each layer was:

Layer A	225 µm
Layer B	10 µm
Layer C	20 µm.

The total thickness of the multilayer film was 255 µm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:7.5.

II c. Test

The thickness of each layer was:

Layer A	45 µm
Layer B	10 µm
Layer C	20 µm

The total of the thickness of the multilayer film was 75 µm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:1.25.

II d. Test

The thickness of each layer was:

Layer A	260 μm
Layer B	10 μm
Layer C	25 μm

The total thickness of the multilayer film was 295 μm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:7.42.

II e. Test

The thickness of each layer was:

Layer A	210 μm
Layer B	10 μm
Layer C	25 μm

The total thickness of the multilayer film was 245 μm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:6.

III. Comparison films

The following multilayer films (III a thru III c) were produced with filled layer A and unfilled layers B and C, as described above, but for comparison purposes with the ratios of the thickness of the unfilled layers to the thickness of the filled layer in each case being outside the scope of the claims of the above application.

III a. Test

The thickness of each layer was:

Layer A	250 μm
Layer B	10 μm
Layer C	20 μm

The total thickness of the multilayer film was 280 μm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:8.33.

III b. Test

The thickness of each layer was:

Layer A	290 μm
Layer B	10 μm
Layer C	25 μm

The total thickness of the multilayer film was 325 μm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:8.28.

III c. Test

The thickness of each layer was:

Layer A	40 μm
Layer B	10 μm
Layer C	25 μm

The total thickness of the multilayer film was 75 μm. The ratio of the thickness of the unfilled layers to that of the filled layer was 1:1.14.

IV. Properties of the films in the Tests of II and III above

4.1 The range of thermoforming temperature (°C) was determined and the appearance was recorded for each multilayer film produced according to Tests II a. thru III d. above. These data are set forth in TABLE 1 below.

TABLE 1

Inventive Film Tests

Film According to Test	Unfilled/Filled Layer Ratio	Range of Thermo-forming Temp. (°C)	Appearance of the Film
II a	1:6.6	125 - 145	paper-like
II b	1:7.5	126 - 145	paper like
II c	1:1.25	115 - 145	paper-like
II d	1:7.42	127 - 145	paper-like
II e	1:6	125 - 145	paper-like

Comparison Film Tests

Film According to Test	Unfilled/Filled Layer Ratio	Range of Thermo-forming Temp. (°C)	Appearance of the Film
III a	1:8.33	140 - 150	paper-like
III b	1:8.28	145 - 152	paper-like
III c	1:1.14	115 - 145	plastic

4.2 The multilayer films according to Test II c and Test III c were further examined by measuring their surface tension according to DIN 53364, their average surface roughness depth according to DIN EN ISO 4288 and their surface slip according to DIN 53375 A to assess the surface texture as well as other surface properties of the films. The data measured are set forth in TABLE 2 below.

TABLE 2

Measured property	Film according to Test II c	Film according to Test III c	Method according to Deutsche Industrie Norm
	paper like	plastic	
surface tension [mN/m]	> 44	34	DIN 53364
average surface roughness depth [µm]	11.1	1.8	DIN EN ISO 4288
surface slip [µD]	0.397	0.173	DIN 53375 A

V. Discussion of Results:

5.1. The above Tests of Paragraph 4.1 show that for the combination of advantageous properties of the film as packaging material, especially for the combination of the paper-like appearance and the very good thermoforming properties (i.e., wide temperature range for thermoformability), the inventive ratio of the total thickness of the unfilled layers to the thickness of the filled layer, namely 1:8 to 1:1.2, is essential. That is, as shown in TABLE 1 above, the inventive films having ratios within this range exhibit both wide thermoforming temperature ranges and paper-like appearance. In contrast, for the comparison films, when the ratio is too low, i.e., less than 1:8 (see Tests III a and III b), the films have a paper-like appearance, but the thermoforming temperature range is very narrow, while when the ratio is too high, i.e., greater than 1:1.2 (see Test III c), the films have a broad thermoforming temperature range, but a plastic appearance.

5.2 The above measurements of Paragraph 4.2 are an attempt to quantify the importance of the paper-like properties of the multilayer films of the present invention. Thus, the paper-like appearance and texture of the films are not only important from the standpoint of customer acceptance, but also have important benefits to the manufacturer of the packaging made from the films and the distributors and sellers of products packaged in the films.

First, it is general knowledge that the higher the surface tension of a film is, the better the printing properties of such a film are. Accordingly, the paper-like inventive film obtained according to Test II c could be printed on much more easily and with a far higher precision and adhesion of the printing than the plastic film obtained according to Test III c.

Second, the better surface texture of the film obtained according to Test II c, expressed in a higher average surface roughness depth as well a higher surface slip (resistance), compared to the film obtained according to Test III c, allows the piling-up of many more packages made of the inventive film during storage and/or for resting on a shelf without any disarrangement than packages made of the plastic film according to Test III c.

5.3 I understand that the Examiner in the above application has raised several concerns about the data presented in my First Declaration:

(a) First, the Examiner was concerned that too many variables (e.g., individual layer thickness, total layer thickness, layer ratio) were being changed, so that it is difficult to determine which variable is critical and responsible for the unexpected properties. It is impossible to keep all variables but one constant and still show a wide range of data points. For example, to show both ends of the ratio range, either the total thickness or the thickness of one layer or both must also change. However, to address this concern, I have attempted to keep as many variables constant as possible. Therefore, in the above tests, I have kept the unfilled layer thicknesses essentially constant at 30-35μm.

(b) Second, the Examiner was concerned that there were not enough data points to demonstrate the unexpected results across the entire claimed range. The above tests address this concern by providing five data points within the range, including points near both ends, and three data points outside the range, including points both above and below the range near the ends. These data points are in addition to the four data points (two inside and two outside the range) which were provided in my First Declaration.

(c) Third, the Examiner was concerned about the effect of the three adhesive layers in each of the multilayer films of my first Declaration, since the present claims require a minimum of three layers, with adhesive layers being only optional. To address this concern, all of the multilayer films in the above tests include only the minimum three layers (filled, barrier and sealing).

Accordingly, I believe that all the Examiner's concerns have been addressed and that the above test results demonstrate criticality of the claimed range of the present invention, which is not at all recognized in the prior art, but is unexpected.

I declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like, so made, are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent application Serial No. 09/851,460 or any patent issued thereon.

(Date) (Walter Bernig)

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10. 8. 2003
(Date)

(Walter Bernig)